Power Electronics-Based Energy Management System for DoN Microgrids Postgraduate School [video]

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With Guest Lecturer Dr. Giovanna Oriti

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Dr. Giovanna Oriti

Abstract

An Energy Management System (EMS) is a power electronics-based controller that monitors power flow and matches load power demand to the available electric power. Power can be available from the AC grid, various energy sources (including renewables) and energy storage devices. An EMS can control distributed generation resources so that they become a microgrid with respect to the main AC grid. The EMS allows a microgrid to operate connected to the grid or in islanding mode when power from the main grid is not available.

The EMS developed in the past few years at the Naval Postgraduate School has been applied to microgrid scenarios that could be used in Department of the Navy (DoN) installations, expeditionary camps or ships. EMS applications to DoN microgrids are attractive because an EMS makes the critical loads in a microgrid independent from any AC grid malfunctions, thus improving energy security.

Biography

Dr. Giovanna Oriti earned the Laurea degree with honors and Ph.D. degree, both in electrical engineering, from the University of Catania, Italy, in 1993 and 1997 respectively. She was a Research Intern at the University of Wisconsin, Madison for two years. After graduation she joined United Technology Research Center where she developed innovative power converter topologies and control. She led the development of an electric power control test bed in order to research new products for the divisions of United Technologies including Otis, Carrier and Pratt & Whitney. Later, in 2000, she launched her own consulting business. She developed physics based models of power converters and drives for Electromagnetic Interference (EMI) analysis, stability analysis and development of control algorithms. She also performed reliability and life cycle predictions for power conversion systems.

Dr. Oriti joined the Electrical and Computer Engineering (ECE) Department, Naval Postgraduate School in April 2008. She is now a tenured Associate Professor. She is involved in electric ship systems and energy management research activities. In 2012 she received the NPS ECE Service Award in recognition of her contribution to the development of the new NPS EE Energy curriculum. She also received the 2016 and 2017 NPS ECE Research Award for her contribution to the US Navy's energy efficiency and energy conservation goals.

Dr. Oriti holds one US Patent and has co-authored 50 papers in IEEE Journals or IEEE conference proceedings. She is an IEEE Senior Member and the recipient of the 2002 IEEE IAS Outstanding Young Member Award. She co-authored a paper that received the 2017 Third Prize Paper Award from the IEEE IAS Renewable and Sustainable Energy Conversion Systems Committee.

Dr. Oriti serves as an Associate Editor for the *IEEE Transactions on Power Electronics*. In 2010-2011 she served as Chair of the Industrial Power Conversion System Department of the IEEE Industry Application Society (IAS). In 2006-2007 she served as Chair of the IAS Industrial Power Converter Committee. She is the lead Technical Program Chair for the Energy Conversion Congress and Expo 2018 (ECCE 2018) conference, as well as the Women in Engineering co-chair.

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